Seasons and Phenology

Introduction

*Seasons**

*S1: What Can We Learn About Our Seasons?**

Students develop a qualitative understanding of the characteristics and patterns of seasons and highlight the relationship of seasons to physical, biological and cultural markers.

*S2: What Are Some Factors That Affect Seasonal Patterns? **

Students use GLOBE data and graphing tools to compare the influence of latitude, elevation, and geography on seasonal patterns.

*S3: How Do Seasonal Temperature Patterns Vary Among Different Regions of the World?**

Students use GLOBE visualizations to display student data on maps and to learn about seasonal changes in regional and global temperature patterns.

*S4: Modeling the Reasons for Seasonal Change**

Students use color visualizations and a 3-D paper model of the Earth to explore the causes of seasons, with a focus on Earth's tilt and its spherical shape.

*S5: Seasonal Change on Land and Water**

Students use visualizations to compare the effects of incoming solar energy in the two hemispheres, furthering their understanding of seasonal change and climatic effects of land and water.

* See the full e-guide version of the *Teacher's Guide* available on the GLOBE Web site and CD-ROM.

*Phenology**

In Phenology Learning Activities, students have the opportunity to explore the effect of environmental changes on plants. They also practice basic science process skills such as quantitative and qualitative observation, inference, measurement, prediction, classification, data collection, analysis, and interpretation, and designing and carrying out an investigation.

*P1: Green-Up Cards **

students participate in a preparatory activity that will help them identify green-up progression in their local plants and this activity also introduces the idea of spatial scale related to plant observations.

*P2: A Sneak Preview to Budburst **

Students learn what to look for during budburst by observing variations in timing and appearance of leaves of different local plant species.

*P3: First Look at Phenology **

Students observe and classify local plants based on their patterns of change other than growth.

*P4: A Beginning Look at Photosynthesis**

Students learn about plant response to light by setting up simple investigations in the classroom.

*P5: Investigating Leaf Pigments**

Students learn about plant pigmentation and photosynthesis while conducting simple investigations to demonstrate the presence of pigments other than chlorophyll in leaves.

*P6: Global Patterns in Green-Up and Green-Down**

Students use visualizations and graphs to investigate the annual cycles of plant growth and decline associated with various land cover types.

*P7: Limiting Factors in Ecosystems**

Students learn about the physical factors that limit the growth of vegetative ecosystems by correlating graphs of vegetation vigor, temperature, and precipitation.

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